men who are ahead of their generation, Mr. Morgan did not receive the popular recognition which was his due and which his native modesty forbade him to seek; but that his work rewarded him with true satisfaction cannot be doubted by those who knew him.

——Congress will soon be occupied with the question of the revision of the tariff. We have already referred[1] to the tax on intellectual progress which has been imposed in the shape of duties on books, apparatus and specimens necessary for private students of natural history in this country. No congressman familiar with the situation would countenance such a piece of medieval barbarism, and if scientists will act in the premises, we have not a doubt that the objectionable legislation will be repealed this winter. But we must act. Let every subscriber to the NATURALIST write to his representative in Congress, and ask for his influence in favor of repeal. Congressmen will naturally give the preference to those objects to which their attention is most urgently directed.

——American "Academies of Science" are frequently constituted like stock corporations, with a sufficient sprinkling of scientific men to furnish credit to the remaining members. Sometimes the president is a scientific man, but the secretary, like those of corporations, is generally selected for his clerical ability; so also many of the other officers. The Philadelphia Academy of Natural Sciences has lately done itself the honor of electing one of its most distinguished scientific members to the office of president. We refer to Professor Joseph Leidy. This is a step in the right direction, and one to be followed we hope by many others of the same kind.

——An American cotemporary accuses the NATURALIST of appropriating from its pages a notice of Dr. Hahn's so-called organic remains in meteorites. The note in question was taken from the Journal of the Royal Microscopical Society of London, and by an oversight was not credited to that source. The failure to credit the article will however hardly be regretted by its author.

——Of all the experts examined during the Guiteau trial, Dr. Edward Spitzka, of New York, seems to be the only one to recognize the fact that a man may be insane by malformation, and not be more diseased than a man with strabismus or with six fingers.

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RECENT LITERATURE.

HABIT AND INTELLIGENCE, by Joseph John Murphy.[2] This is a thoroughly well written and thoughtful work, and one which will well repay perusal even by those who are not prepared to accept the conclusions which the author himself asserts rather than endeavors to prove.

The writer is a thorough evolutionist in so far as the doctrine

[1] NATURALIST, February, 1881.

[2] *Habit and Intelligence;* a series of Essays on the Laws of Life and Mind. By JOSEPH JOHN MURPHY. Second Edition Illustrated. pp. 585. London. Macmillan & Co. 1879.

of evolution applies to organic life. He sees his way clearly for the continued development of life from the simplest protoplasmic protozoan upward to the complex bodily and mental organization of the higher mammals and of man himself. He traces with due precision the differentiation of a nervous system, and the gradual growth therefrom of the powers to which we give the names of consciousness, mind, and intelligence—the latter of which is but the result of consciousness. He perceives, in concert with most American naturalists, the insufficiency of Darwin's theory of "natural selection" to account for the *origin* of the slightest variation, though he admits, with some hesitation and occasional contradiction of himself, its efficiency to preserve a beneficial variation when it has once arisen. To refute Darwin he gleans facts and theories from Cope, Mivart, Wallace, and other naturalists, accepts also the aid of the physicists who deny the possibility of the countless millions of years required by the "natural selection" theory; and succeeds in fortifying himself in a position from which it would be difficult indeed for a pure Darwinian to dislodge him. But he dismisses in few words Spencer's masterly theory of the influence of the total environment upon an organism, and scarcely notices Cope and Hyatt's proofs of the ease with which new genera can be produced by an acceleration or retardation of the embryological stages of life.

Having thrown doubt upon Darwin, he is in a hurry to assert that all evolution is the result of a "Formative Intelligence" originally impressed upon organic existence from a source outside of them.

He does not admit the possibility of the evolution of the lowest protoplasmic life from inorganic matter; and still less can he conceive of the evolution from simple matter of the molecules of the so-called elements of the chemist. Upon such subjects as the origin of life the only safe position is that of the agnostic; we do not "know," we have no "positive proof," similar to that which tells us of our own existence, or informs us of the existence of tangible objects. But the agnostic may have his opinion, his belief, comparable to the beliefs and creeds of the religions and sects, and like them, incapable of "positive proof." But while the belief of the creeds is based upon a book or upon traditions, the opinions of the agnostic, held by him loosely and susceptible of modification in the face of new discoveries, are always in harmony with the facts of which we have "positive proof," and do but form their logical continuation.

Such a statement as that on page 41 of Mr. Murphy's book—"the notion of any finite thing existing without having been created is more inconceivable—it is absurd," proves nothing and disproves nothing. We admit that it is inconceivable, it is "too high, we cannot attain unto it," yet it is simpler than the belief in a Creator who breathed into certain particles of matter

a "Formative Intelligence," and then left that intelligence, distributed among a number of organisms struggling for existence, to take care of itself, and to develop into higher life through an ordeal of suffering and in spite of imperfection, disease, and the dying out of individuals and of species; without taking any further interest in the life he had created. Still more is it simpler than to conceive of an omnipotent, omnipresent, personal, and good God who, after creating life, watches and sustains it, yet permits an evil spirit to exist, and allows pain and disease to mar the beauty of his creation. To conceive of the matter of the universe as capable of evolving conscientiousness is past our mental power, but is the difficulty removed by having to account also for the origin, existence and habitat of a non-material Creator who beneficently allows a non-material destroyer to play havoc with his creation? On this subject Mr. Murphy does but assert his opinions, his argument really stops with the accumulation of proofs of the coëxistence of intelligence with life—a point in which we cordially agree with him, objecting only to his term "unconscious intelligence," as applied to the acts of the lower animals. In this matter we would go further than Mr. Murphy. Proud man, ignorant of the inner life of the lower animals, finds it difficult to stand outside of his individuality sufficiently to judge fairly of their actions. Our author quotes the building of hexagonal cells by the honey-bee as an instance of unconscious intelligence. We believe, in the light of the numerous observations made by Lubbock, McCook, and others on hymenopterous insects, that one or several bees discovered this economical form of cell just as man stumbles, by simply trying, on the greater part of his discoveries. To account for the perpetuation of the discovery when made we have no need to call in "natural selection," or any power more abstruse than that of inter-communication, which is well known to be possessed in a high degree by ants and bees.

One of the principal points sought to be made out in favor of a "formative impulse" is the development of structure in advance of function, as evidenced in the metamorphoses of the Hydroida, Ascidia, Crustacea, and Batrachia, in all of which the writer contends that structures useless to the possessor are laid down in anticipation of a future development, in which such structures are useful. Such structures are the long abdomen of a Zoea, useless (our author asserts) to the Zoea, but coming into use in the lobster; the notochord of the Ascidian, destined to be aborted, but foreshadowing that of the vertebrate; the incomplete medusa buds of some hydroids, anticipatory of the free medusæ of others; and the transition from swimming bladder to lung, foreshadowed in Ganoids and Dipnoans, and carried out in the Batrachia. A teleologist might reasonably query by what process of reasoning it is provable that these structures,

transitional though they may appear to us, are not of use to their possessors. But the gradual evolution of a structure not yet become functionally useful, is but a parallel case with the persistence for a long period of structure no longer functionally useful. The wonder is rather, when we review the wondrous changes passed through in the life history of an animal or of a plant, from the seed to the tree, from the egg to the free embryo and thence to adult life, that all works so truly as it does, and that variation is not more frequent. The slightest over-development of one organ, or arrest of development of another, caused by the surrounding environment or by heredity (the effect of the environment of ancestors) may change the genus, the change may neither be useful or hurtful, yet its tendency is to continue when commenced, and it may, in process of time, become functionally useful. On the other hand, a useful variation may take place suddenly (as we see in Amblystoma) and a hurtful one is put an end to by the death of the possessor. We commend this book to the notice of our readers.

SOUTHALL'S PLIOCENE MAN IN AMERICA.[1]—The author evidently means well enough in writing this pamphlet, but he appears to start with the idea that geology is an exact science, that we know the precise time, even geologically speaking, when the Pliocene epoch ended and the Quaternary began, and that certain haphazard estimates of the time in years that man has been on the earth made by an accomplished zoölogist like Mr. A. R. Wallace, who has, however, published little or nothing original upon palæontology or geology, are of real value. So when ten years ago a "Mr. Vivian and Mr. A. R. Wallace claimed for [man] an antiquity of 1,000,000 and 500,000 years" we do not see why Mr. Southall or any other man should in 1881, get into a flurry over the matter, unless he wants to make himself conspicuous as a critic of geologists and geological reasoning in general. Confining ourselves to the points of most importance in the query as to the age of Pliocene man, the geologist wants to know the limits of the Pliocene in western America. What Whitney calls Pliocene deposits may be contemporary with the incoming of the glacial period in eastern America, or it may be a transition period between the Pliocene and Quarternary period. As we understand it, the age of those lower level gold-bearing sands and gravels is quite uncertain, and they may, contrary to Whitney's opinion, be no older than our eastern boulder clays. Moreover what Mr. Southall overlooks, none of the specimens of human art found on the Pacific coast, in so-called Pliocene deposits, have been taken out either by the hands of or in the presence of a geologist, not even of Professor

[1] *Pliocene Man in America.* By JAMES C. SOUTHALL, being a paper read before the Victoria Institute, or Philosophical Society of Great Britain, with remarks by His Grace the Duke of Argyll, Professor W. Boyd Dawkins, Principal Dawson, Professor T.McK. Hughes, and others. London. [1881.] 8vo, pp. 30.